

WHAT IS CLAIMED IS:

1. An apparatus for preventing senility that constructs a Noise-Vocoded Speech Sound signal produced by dividing at least a portion
5 of a speech signal into a frequency band signal and subjecting the frequency band signal to noise degradation, and outputs the Noise-Vocoded Speech Sound signal.
2. An apparatus for preventing senility that constructs a
10 Noise-Vocoded Speech Sound signal produced by dividing at least a portion of a speech signal into a plurality of frequency band signals and subjecting the frequency band signals to noise degradation, and outputs the Noise-Vocoded Speech Sound signal.
- 15 3. The apparatus for preventing senility according to claim 1 or 2, comprising:
 - a first bandpass filter section having a plurality of bandpass filters for extracting a signal of a prescribed frequency band from the speech signal,
 - 20 an envelop extraction section having envelope extractors for extracting an envelope of each frequency band signal extracted by the first bandpass filter section,
 - a second bandpass filter section having a plurality of bandpass filters for extracting a noise signal corresponding to the prescribed
25 frequency band from a noise source signal,
 - a multiplication section for multiplying outputs from the envelop extraction section and the second bandpass filter section for each frequency band, and
 - an addition section for summing up outputs from the multiplication
30 section to produce the Noise-Vocoded Speech Sound signal.

4. The apparatus for preventing senility according to claim 3, wherein
at least one of the number of the bandpass filters and the boundary
frequency of frequency bands of the bandpass filters can be modified at least
5 according to a language.
5. The apparatus for preventing senility according to claim 3 or 4,
wherein at least one of the number of the bandpass filters and the boundary
frequency of frequency bands of the bandpass filters can be modified
10 through automatic language recognition.
6. The apparatus for preventing senility according to any of claims 1
through 5, further comprising a speech signal extractor for extracting a
speech component from the speech signal, wherein the Noise-Vocoded
15 Speech Sound signal is produced from an output from the speech signal
extractor.
7. The apparatus for preventing senility according to any of claims 1
through 6, further comprising a microphone, wherein the speech signal is an
20 output signal of the microphone.
8. The apparatus for preventing senility according to any of claims 1
through 7, further comprising a speech source signal section that stores the
Noise-Vocoded Speech Sound signal, wherein the Noise-Vocoded Speech
25 Sound signal is produced from a speech signal read from the speech source
signal section.
9. An apparatus for preventing senility that stores a Noise-Vocoded
Speech Sound signal produced by dividing at least a portion of a speech
30 signal into a single frequency band signal or a plurality of frequency band

signals and subjecting the frequency band signal or the frequency band signals to noise degradation, and comprises a speech source signal section for outputting the Noise-Vocoded Speech Sound signal.

- 5 10. The apparatus for preventing senility according to any of claims 1 through 9, further comprising:
 - an output section for outputting the Noise-Vocoded Speech Sound signal,
 - a response input section for accepting a user's response, and
 - 10 a correctness output section for outputting the correctness of the response.
- 15 11. A method for preventing senility constructing a Noise-Vocoded Speech Sound signal produced by dividing at least a portion of a speech signal into a frequency band signal and subjecting the frequency band signal to noise degradation, and outputting the Noise-Vocoded Speech Sound signal.
- 20 12. A method for preventing senility constructing a Noise-Vocoded Speech Sound signal produced by dividing at least a portion of a speech signal into a plurality of frequency band signals and subjecting the frequency band signals to noise degradation, and outputting the Noise-Vocoded Speech Sound signal.
- 25 13. The method for preventing senility according to claim 11 or 12, wherein the Noise-Vocoded Speech Sound signal is produced by extracting a signal of a prescribed frequency band from the speech signal using a first bandpass filter section having a plurality of bandpass filters,

extracting an envelope of each frequency band signal using an envelope extraction section having envelope extractors,

applying a noise source signal to a second bandpass filter section having a plurality of bandpass filters and extracting a noise signal
5 corresponding to the prescribed frequency band,

multiplying outputs from the envelop extraction section and the second bandpass filter section in a multiplication section, and

summing up the outputs from the multiplication section in an addition section.

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14. The method for preventing senility according to claim 13, wherein at least one of the number of the bandpass filters and the boundary frequency of frequency bands of the bandpass filters can be modified at least according to a language.

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15. The method for preventing senility according to claim 13 or 14, wherein at least one of the number of the bandpass filters and the boundary frequency of frequency bands of the bandpass filters can be modified through automatic language recognition.

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16. The method for preventing senility according to any of claims 11 through 15, wherein only a speech component is extracted from the speech signal, and the Noise-Vocoded Speech Sound signal is produced from the extracted speech signal.

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17. The method for preventing senility according to any of claims 11 through 16, wherein an output signal of a microphone is the speech signal.

18. The method for preventing senility according to any of claims 11 through 17, wherein the Noise-Vocoded Speech Sound signal is produced from a stored speech signal.

5 19. A method for preventing senility that reads out and outputs a stored Noise-Vocoded Speech Sound signal produced by dividing at least a portion of a speech signal into a single frequency band signal or a plurality of frequency band signals and subjecting the frequency band signal or the frequency band signals to noise degradation.

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20. The method for preventing senility according to any of claims 11 through 19, comprising:

an output step of outputting the Noise-Vocoded Speech Sound signal,
a response input step of accepting a user's response, and

15 a correctness outputting step of outputting the correctness of the response.